



COOPER HEWITT DESIGN PROCESS

ROBOBEE

Cooper Hewitt's diverse and comprehensive collection and exhibitions showcases many designs that solve real-world problems. One of those designs, the RoboBee, tackles the same challenge as this year's competition: **What would you design (or redesign) that is a nature-based solution to a global problem?** Through the design process below, learn how the designers tackled their challenge.



DEFINE

Colony Collapse Disorder, which refers to the rapid and unexplained death and disappearance of bee colonies around the world, threatens the world's food supply. Designers at Harvard defined their challenge: How might we design a way to pollinate crops based on nature?



EMPATHIZE

In order to address their challenge, the designers looked closely at bees and bee colonies to understand the ways that they behave and interact with each other and the environment, including how they pollinate crops.



BRAINSTORM

After many observations and brainstorming sessions, the designers decided to base their solution on real bees in three ways: body, brain, and colonies. They wanted the bees to be able to interact with each other so they can work as a single swarm, coordinating their behavior to accomplish large tasks.



PROTOTYPE

Facing the challenge of producing minuscule mechanical devices, designers borrowed techniques from pop-up books, sandwiching sheets of laser-cut materials together into a thin, flat plate that folded up into the complete structure.



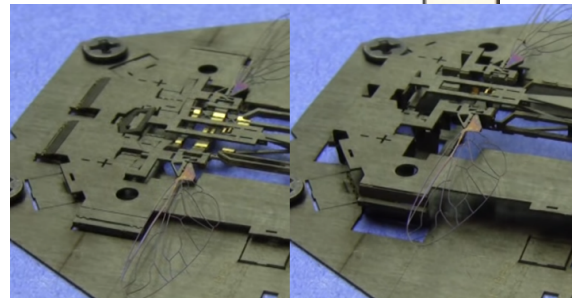
TEST

With each prototype, designers tested and refined the structure, materials, and programming to improve the flight capabilities and controls, achieving a small and lightweight design that functioned like a bee.

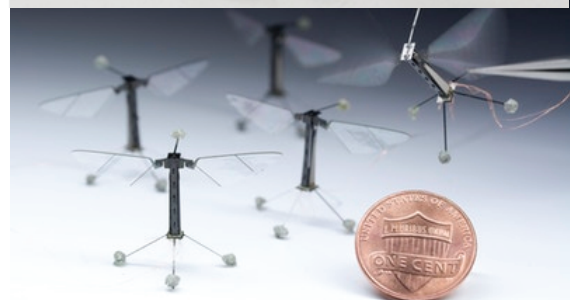


LAUNCH!

Weighing 80 milligrams, approximately the weight of a honeybee, with a wingspan of a little more than 1 inch, the RoboBee is the world's first insect-scale flying robot. Once fully launched, it may tackle other large challenges in addition to pollinating crops, such as being used for search and rescue missions or monitoring environmental conditions in places humans cannot go safely.



Designers used folds inspired by pop-up books to design a lightweight robot.



What's your idea? Now it's your turn! To jumpstart your design process, grab a sketch pad and start brainstorming ideas, or even build a couple of quick prototypes using materials found around your house to help you work through and advance your thinking. Formulate as many ideas as possible and don't worry if your sketches or models aren't perfect—you won't be judged by your drawing skills! Visit cooperhewitt.org/designcompetition.